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STANDARDIZATION
FROM
MARINE EQUIPMENT SUPPLIERS PERSPECTIVE

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ABSTRACT

The deep depression of the shipbuilding industry in the United States has brought into sharp focus the fact that broad and sweeping changes must be rapidly implemented if the industry is to survive. The factors leading to the decline of U. S. shipbuilding are many and complex and there are no quick and easy solutions. However, it must be recognized that many of our traditional manufacturing procedures and techniques are prominent among those factors. Although some of the industry's problems may be outside the influence of technical societies, manufacturing procedures and methods are not, and are, in fact, already being dealt with through the Society's participation in the National Shipbuilding Standards program. The task is not easy, however, since there has been considerable indifference, if not outright resistance, to standardization by marine equipment suppliers, particularly deck machinery manufacturers.

INTRODUCTION

Precedents

The idea of standards is not new. Throughout recorded history, many cultures and societies have implemented various standards in order to establish some basis or benchmark by which fair, equitable and consistent practices could be assured in Commerce. and industry. In the ASTM publication "The What and Why of Standards", (1) an Old Testament passage is cited as one of the earliest standards when God told Noah "Make thee an ark of Gopher wood; rooms shalt thou make in the Ark, and shall pitch it within and without with pitch" (Genesis 6:14). Coincidentally, it should be noted that this was probably the first shipbuilding standard!

Although the idea of standards has its roots deep into antiquity, the creation and implementation of industrial and voluntary consensus standards is relatively new. Previous standards, such as the Biblical one noted above were imposed without choice by a higher authority. A classic example of this is seen in the establishment of a standard railroad gauge in the 19th Century to permit the rapid transfer of railway cars with their passengers and cargo from one rail line to another. Without this standard, the development of the great American west would have been seriously impeded and the exchange goods and products across the nation would have been extremely difficult.

By the mid-19th Century, as the Industrial Revolution began to gain momentum, the need for standardization began to be realized.

Significantly, this impetus was not based on government or authoritative edicts, but from leaders within industry itself who saw the creation of standards as being in their own best interest, as well as for the general welfare and public good. Gradually, as representatives of various industrial segments began to join efforts, the foundations were laid for many standardization societies with which we have become quite familiar. Early among them were the American Society for Testing and Materials (ASTM) the American Gear Manufacturing Association (AGMA) followed by others, such as the National Electrical Manufacturers Association (NEMA), National Fluid Power Association (NAPFA), the American Welding Society (AWS) to name a few. With the emergence of so many standards writing groups, duplications and contradictions were inevitable. In an attempt to help counter some of these problems, the American National Standards Institute (ANSI) was formed to coordinate the writing of standards. In more recent times, as new technologies and discoveries appeared, the writing of standards and their implementation have proliferated and will, doubtless, continue to do so.

Standards and Shipbuilding

Although the United States shipbuilding industry benefited greatly from standardization by other agencies, it is ironic that the industry had no standards for the production of its own products. In fact, there appeared to be little or no interest in standards development until the 1970's when, through the efforts of both government and the industry, the National Shipbuilding Standards Program evolved. This was followed a year later by the activation of the SNAME Panel, SP-6 and in 1978 the ASTM Committee, F-25 on Shipbuilding was formed. (This Committee, comprised of hundreds of volunteers from every segment of the shipbuilding industry, is currently engaged in a vigorous effort to draft comprehensive and concise standards for shipbuilding. Their efforts are supported by active cooperation and encouragement from many other agencies, including SNAME, MARAD, the Navy and other standarding groups.

The task is slow and arduous and we are, perhaps, yet years away from a complete set of workable and meaningful standards. To make the picture even gloomier, the United States, once the most productive shipbuilding nation in the world, has become at best a third rate producer. In fact, the production of ocean going merchant vessels in the United States is at a virtual standstill.

The Worth of Standards

It would be naive to suggest that the lack of standards alone led to the demise of our industry. There are many other complex and far reaching factors which contributed to the decline. However, the absence of clearly defined standards for manufacture, construction, methods, and materials created a virtual technical Babel of Confusion with no real means to stimulate the exchange of ideas or create joint

counter measures. The consequence was that even while we were losing, we knew we were losing, but most of us did not know why.

STANDARDS AND THE MARINE EQUIPMENT SUPPLIER

Resistance

Typically, the average U.S. supplier of marine equipment has been thoroughly American; independent, confident, secretive, arrogant, competitive, jealous, ingenious and reliable. Nurtured in the culture of the world's greatest system of free enterprise, he came to regard anything American made as being the best in the world and his particular product as being the best of the best. And, although he was not above "copping" the ideas of his rivals when it suited his best interests, he would have been horrified at the idea of free exchange of ideas and tended to view the concept of standardization as an encroachment on his right to creative and innovative thinking. And yet, there were standards of a sort. They were the standards of custom, tradition and the unwritten concept of "the right way to do things". For many decades, these concepts not only prevailed, but also worked; and, as a matter of fact, did result in some of the world's finest products. During the challenging days of World War II, another set of standards were gradually developed, as the best minds in the industry and Navy worked together to further formulate and refine Navy standards and specifications which, for the most part, became the industry standard for all marine equipment. These were largely carried over into the commercial field even after the war. Needless to say, equipment designed and built to the severe requirements of military use were unsurpassed for quality, datability and reliability. They were also unsurpassed for price.

Complacency and Shock

Subsequent to World War II, marine equipment suppliers, confident in the excellence of their products did little to address changing conditions, but continued to rely on what they believed to be the optimum. Although some new ideas were advanced, they were largely rejected by builders and users alike. Early on, when U. S. suppliers began to lose some orders to foreign competitors, there seemed to be undue excitement. The general attitude toward the foreign made equipment was quite often expressed as "cheap", "junk", "it won't last", or "you can't compete with fifty cent labor". It was not unlike the attitude of the U. S. automobile industry who, convinced Americans would never give up their big gas guzzlers, saw the Volkswagen as a novelty and a fad until one day they were shocked and awakened to the fact that Toyotas, Datsuns and Mazdas were dotting the entire American landscape. The marine equipment people were in for some surprises too. As the trickle of foreign equipment became a stream and then a torrent, we came to realize that their products were inexpensive, but not "cheap different, but not "junk"; they did last; and, although built by workers at a lower wage, had been designed economically to an entirely different set of standards. We could take some bittersweet comfort in believing our products to be better, but we could not say theirs were inadequate. The tragic fact is, we were trying to play the same ball game to a different set of rules.

WHERE ARE WE TODAY - OR WHY STANDARDS?

We, who are in the marine equipment business, must face the fact that the day of the backyard inventor is over. The world is too technologically advanced, too complex and too competitive for any man or group of men to survive alone. There must be some meeting of minds; some exchange of ideas whereby we can outline some basic parameters

to foster the acceptance and use of our equipment. For our industry to survive, the U.S. shipbuilding industry must survive. For the shipbuilder to survive, he must find new and better ways to increase productivity, reduce costs and improve deliveries. While much of this is incumbent on the shipbuilder himself, there is much that can be done by the marine equipment manufacturer to assist him in this formidable task. Perhaps, one of the best ways to accomplish this goal is for the shipbuilder, supplier and user to formulate and implement specific, concise and usable standards.

Standards for Communication

Historically, one of the biggest problems for the shipbuilder and the equipment supplier has been a problem of communication. Too often, the equipment delivered to the shipbuilder bears very little resemblance to what the purchaser had in mind. The reason is quite simple. Communication between the purchaser and supplier has been inadequate and confusing. The net result has been added costs and delays. It has also created a way for the unscrupulous entrepreneur to undercut legitimate suppliers-and walk away with all the marbles at the expense of the shipbuilder. In his paper, "Cost Reduction in Deck Machinery", Mr. Don Pettit says, "the terminology of deck machinery is a mixture of seagoing terms from antiquity and master mechanics or engineering terms from many fields. One of the earliest pay-off's from the National Shipbuilders Standards and Specification program may be in the area of standardized terminology and ordering information".(3) A well written standard can delineate clearly and concisely the different types and grades of equipment plus a comprehensive purchasing information check list understandable to purchaser and supplier alike.

Standards for Interfacing

As simple as it may sound, the installation of marine equipment can be one of the most exasperating and expensive problems the ship-builder faces. While even the best written standard cannot identify or establish all interfacing requirements, it can provide for the major ones and call attention to others to prevent overlooking them. "Standards can certainly address foundationing requirements and even provide a means for actually integrating the equipment with the ships structure." (3) Many other" interfacing needs, such as electrical requirements, piping connections, maintenance access, ships service air, cooling water, special tools, lifting provisions, if not actually identified can be called for in the standard. With such information in hand during the production design stages of a ship, many man hours and dollars can be saved when it is time for the installation.

Standards for Design Improvement

One of the strongest and loudest protests against standardization has been that it will stifle design creativity and innovation and that competition will be strictly based on price and price alone. At first glance, this appears to be true; however, a more detailed and objective view would indicate that the exact reverse is the case. Too often, we have striven to make our product unique without making it better. Once basic design parameters are established, the designer is then face with more critical and meaningful problems, such as performance quality cost effectiveness, improved designs, more efficient manufacturing procedures, reliability, better materials and material selection, lower maintenance, better quality, and better user acceptability. A classic example of this can be cited. The National Electrical Manufacturers Association (NEMA) was founded in 1926 to establish standards for the manufacture of electrical products. Among those standards written,

was the standard for electric motors. This standard established basic physical characteristics with which most of us have become intimately familiar. These characteristics included frame sizes, type, mounting dimensions including bolt sizes and locations, shaft location and dimensions, keyway sizes and several others. Far from creating a technological vacuum, we have seen competitiveness increase as the various manufacturers have worked to achieve better performance, better materials, improved insulations, better bearings, reduced cost and greatly increased reliability; until today most of us recognize the electric motor as one of the most efficient and reliable mechanical devices on earth.

Standards for marine equipment may never be as all encompassing as the standard for electric motors, but it seems reasonable to conclude that better standards will result in better products.

Standards for Standards

Note that this subtitle does not say "Standards for Standards Sake". The designer of marine equipment is innundated with a myriad of standards covering the entire spectrum of materials, procedures, and methods. Often, he is still researching standards when the design should be half completed. In their paper, "Machinery Standards in the Global Arena" (4), Messrs. Narbut and Ridley approximated that more than 3,000 standards from producers, users and regulators can impact the various segments of marine design. Obviously (and thankfully), not all these standards apply to any one product. The standard for wooden crates will have little interest or information for the designer of a gear set, while the shipping supervisor, who builds wooden crates has little use for the AGMA standard for gear design. Therefore, specific standards for specific equipment can cut through this curtain

of confusion by identifying other standards which apply directly to equipment to be produced; by grouping the standards to specific aspects of the design; and by selecting certain standards to the exclusion of others, thus preventing ambiguities and needless redundancies.

THE ELEMENTS OF A STANDARD

The dictionary defines a standard as "a means of determining what a thing should be". Volumes have already been written on standards as to content, format, scope, etc. , therefore, for the purposes of this discussion, a few basic elements will be considered as being the germ of many other discussions.

Consistency

Consistency within a standard has many facets. Insofar as possible, it should be consistent with general practice, state of the art, actual need, overall goals and existing requirements. It must assure that every competent supplier has equal opportunity and that the shipbuilder can be assured of a quality product regardless as his source.

A young lady queired about her dress size replied, "I take a Saks 8, a Rosenblum 10 and a K-Mart 14". This is not the kind of standard we need. In a recent meeting of the ASTM F25.08 Steering Gear Task Group, there was considerable discussion over the appearance of efficiency factors for various rudder actuators. These factors have been in wide usage for many years and are included in the Military Standard for steering gears. After considerable discussion, it was suggested that the factors be included for guidance, but that other factors supported by calculations or test evidence could be used.

Although the final standard may or may not include these factors, here is an example of how standards must be consistently applicable while permitting new and better approaches.

Flexibility

As seen in the foregoing, standards must permit flexibility. First, there must be flexibility within the standard. In order for a standard to have meaning and value to the shipbuilder and user, we must necessarily have certain peripheral constraints and limitations; however, we must leave sufficient inner space for the creative mind to work and new ideas to fill. Another example is taken from the steering gear world where for many years a limit on hydraulic pressure has been stated in maximum pounds per square inch. This was established at a time when hydraulic components were far less developed than today. If left to stand, where is the incentive to develop better components? Many similar parallels could, no doubt, be drawn. It is essential that we not lock out innovation and creativity.

Specific

The quality of a standard is not based on its length or number of words, but rather on what it actually says. A useful standard clearly states what a thing must be. The vagueness, ambiguities and incompleteness of our previous methods must be eliminated. The standard must be drafted in such a way that both purchaser and supplier clearly understand each other. Type, class grade, performance requirements, envelope sizes, interfacing constraints and all other necessary data must be anticipated and addressed if the standard is to be usable.

Realistic

Standards writing groups must be fully aware of the fact that the U. S. shipbuilding industry has to compete worldwide. To this end,

they must look at the standards of their competitors. The development of standards will be of little value if they impose more stringent requirements than those of other countries. No one wants to undermine the quality and integrity of American products; but if marine equipment suppliers in the United States are compelled by standards to produce a more expansive product than can be acquired elsewhere, then our own shipbuilders and shipowners will continue to buy foreign made equipment.

Conclusion

In conclusion, it must be stressed that the ultimate value of any standard will be in its utilization. Over the past several years, literally thousands of man hours and dollars have been voluntarily contributed toward the development of meaningful standards - and we have just begun. Many more hours and dollars will be expended before the task is complete. However, all this effort will be in vain if the resultant standards are not used and applied. While there will always be instances where special equipment will be required, this should be the exception rather than the rule. In our highly competitive world, we must avoid situations where the number of pages listing the exceptions to the standard outnumber the pages of the standard itself. Then, and only then, will standards prove their worth.

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